

DOCUMENT RESUME

ED 211 888

CG 015 680

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TITLE A Review of the History of Field Dependence.
PUB DATE Aug 81
NOTE 20p.; Paper presented at the Annual Convention of the American Psychological Association (89th, Los Angeles, CA, August 24-26, 1981).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Cognitive Processes; *Environmental Influences; *Individual Differences; Literature Reviews; *Personality Traits; Psychological Patterns; *Psychological Studies; Psychology; Research Methodology
IDENTIFIERS *Field Dependence

ABSTRACT

This paper reviews 35 studies important in the historical development of field dependence, a popular research topic in psychology. The first section involves antecedents of the concept of field dependence, such as the influence of Kurt Lewin. Part two deals with the development of field dependence as an individual differences variable. Part three involves major criticisms of the early formulations; part four suggests conclusions about the early research efforts. (Author/JAC)

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A Review of the History of Field Dependence

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Recent articles have reviewed such varied aspects of field dependence as its relationship to learning and memory,¹ explanations of the sex differences in field dependence,² and its relation to interpersonal behavior.³ Since the early 1960s literally hundreds of research papers have looked at various aspects of field dependence. Field dependence is currently one of the most popular research topics in psychology.

The purpose of this paper is to review some of the historical developments of the concept of field dependence; thirty-five studies will be cited. The earliest study cited was published in 1892 and the latest in 1961, shortly before the boom in research stimulated by the book Psychological Differentiation.⁴

The paper is divided into four parts. Part one involves antecedents of the concept of field dependence, such as the influence of Kurt Lewin. Part two deals with the development of field dependence as an individual differences variable. Part three involves major criticism of the early formulations of field dependence. Part four gives conclusions.

Antecedents of Field Dependence

The following studies are cited because they seem to be studies that set the stage for Witkin and his colleagues to seize the opportunity to turn some potentially troublesome findings into a very productive individual difference variable. Essentially, two forces seemed to converge. First was a group of psychologists interested in what device or system enables people to spatially orient themselves to

"up" and "down." Second was a group who saw this question as a logical issue to be addressed, at least theoretically, by Gestalt psychology. It appears that Witkin (perhaps the most influential researcher in the area) started out with a simple interest in the question, "How do we know up from down?"

Jastrow⁵ suggested that perception of angles and positions of lines occurs in relation to "an ideal vertical and horizontal which we constantly carry with us and have had forcibly impressed upon us by the countless verticals and horizontals with which civilization has surrounded us." This early paper illustrated the type of research and thinking upon which Witkin's notions of field dependence were built. In this study, accuracy of perception of the true vertical or horizontal was tested by having subjects move a disc until a line upon it appeared exactly horizontal (or vertical). Results indicated that there was some variability in subjects' ability to perform this task.

In response to Koffka's relativistic theory of spatial position,⁶ an experiment was devised in which subjects were to adjust a faint blue line of light so that it was vertical. Subjects were in complete darkness so they could not rely on "points of anchorage" in the visual field.⁷ All errors from the true vertical were small and no significant individual differences in performance were observed. It was concluded that subjects must have been relying on "the absolute vertical and the position of the body, and not to any appreciable extent upon points of anchorage in the visual field."

It is clear from early Gestalt writings by Kurt Lewin that certain

properties of the "motor-perceptual region" have large differences that are dependent upon personality and age.⁸ In the following paragraph Lewin⁹ clearly put forth the challenge.

In reality, the dynamics of environmental influences can be investigated only simultaneously with the determination of individual differences and with general psychological laws. The discovery of psychological laws, on the other hand, yields important insights into the significance of environmental factors and individual characteristics. It will be plain from these considerations what vital importance the systematic--especially the experimental--investigation of environmental changes with the same individual has for the study of the environmental forces.

One early study required subjects to perform a task called the Vigotsky Test.¹⁰ This task required the ability to think in an abstract and logical manner. In observing methods used to solve the task, Hanfmann noted two basic styles. One involved thinking as the predominant mode and the other involved the predominance of perceptual or situational factors.

In a technique similar to Neal's,¹¹ subjects were deprived a visual frame of reference and in addition, were put in a centrifuge. Again, subjects were told to adjust a line so that it was vertical. They were subjected to both stationary and rotary conditions. Noble noted that there were individual differences in errors in the

stationary condition. Noble interpreted the results in terms of Mach's hypothesis of the physical force determinants of psychological verticality. This hypothesis asserted that any point around which a person is spinning will be perceived by that individual as "down" and its opposite would be "up." Mach reports, however, that in experiments where he was the subject he often experienced down as somewhere between the actual ground and that center point in the centrifuge.¹²

In a series of studies on how humans orient themselves toward up and down, Witkin and Asch found the following: (a) visual factors played the primary role in space orientation; (b) postural factors did play a strong secondary role; (c) as the visual field became weaker its impact in space orientation diminished, with subjects relying more heavily on postural cues; (d) striking individual differences were found in subjects' ability to make decisions and correctness of decisions made.^{13, 14, 15, 16}

The Development of Field Dependence

Essentially, there seem to be four critical factors in the development of field dependence as an individual difference variable. First, researchers began to recognize and report large individual differences in subjects' responses to spatial orientation tasks. More importantly they were able to formulate hypotheses about why that might occur. Second, researchers developed instruments for assessing field dependence which were easily administered, brief and highly correlated with more expensive, cumbersome measurement devices. This

seems to have paved the way for the widespread use of this variable in so many areas. Third, psychologists were beginning to recognize a place for experimental methods in the study of individual differences. Correlational research was no longer the only method available. Fourth, after the notion of field dependence was fairly well developed, researchers started correlating field dependence results with results from personality inventories and tests.

Witkin¹⁷ discussed individual differences in spatial orientation. He related different modes of perception of spatial orientation to "deep-seated" characteristics of the person with the intent of identifying personality patterns that are associated with different modes of perception.

The tilting-room-tilting-chair test of field dependence was first reported by Witkin.¹⁸ Previous methods did not allow for the conditions of subjects being tilted in an ostensibly "normal" environment. With this test, both the room and the chair the subject was in moved and could be positioned in such a way that both room and chair were at an angle but gave the appearance of being exactly straight up and down. This device was thought to more directly tap the issue of body cues, versus visual cues, in space orientation, but subsequent research showed a high correlation between this and three other methods of measuring field dependence.¹⁹

Witkin²⁰ varied the structure and stability of the visual field upon maintenance of an upright posture. The four visual conditions were (a) a fully-lighted room (full visual field), (b) a luminous cube

surrounded the subject in a dark room (limited visual field), (c) blindfolded subject (no visual field), and (d) the luminous cube rocked around on its horizontal axis in a dark room (unstable visual field). Witkin noted that marked individual differences were found in body steadiness under all four conditions and large individual differences were also found in the rate of adaptation to the unstable field.

In 1950 Witkin also developed a paper and pencil test relating to perceptual ability called the Embedded Figures Test. The task involves picking out a particular figure from a complex drawing. He found that also on this perceptual task large individual differences were obtained.²¹

Using a method prototypical of the tilting-room-tilting-chair test, Witkin for the first time manipulated not only the visual cues for uprightness, but also the postural cues. He did this by building a device that rotated the subjects themselves along a "circular path" as well as moving the walls. When a visual field was absent, subjects were much more reliant upon postural cues than they had been before in trying to place a rod in a vertical position. When a conflict existed between visual and postural cues large individual differences would result. Individual differences were also fairly large in the "no visual cue" condition.²²

In a study extending the findings of Witkin's research using the four visual conditions,²³ subjects were found to locate perceived upright in different positions depending on whether or not a visual cue was present.²⁴ When visual cues were present, subjects lined up the

vertical bar much closer to what would be vertical for the wall (if the wall were actually vertical). When no visual cues were present, subjects lined up the bar closer to what would be vertical if their bodies were vertical (which they were not at the time).

In order to explain the discrepant findings of Mann²⁵ and Witkin and Asch,²⁶ a study was conducted by Mann and Boring²⁷ in which the nature of the instructions in space perception studies was investigated. One group of subjects was told what the task was, how to solve the task, and were then given a few practice trials (sophisticated group). The other group was simply told to set the target rod to the vertical position and was given no additional information or practice trials (naive group). The sophisticated group was more precise and made fewer errors. Mann and Boring²⁸ compared the naive group to subjects in the Witkin and Asch²⁹ study and the sophisticated group to Mann's,³⁰ thus explaining differences in the two sets of findings.

Witkin³¹ responded to the Mann and Boring³² article by saying that their study "appears to have been based on a serious misunderstanding of the procedures used in our laboratory." Witkin further stated that his own instructions corresponded more closely to those given in the "sophisticated" group and concluded that differences in results found by the two research efforts cannot be attributed to differences in instructions.

Gollin and Baron³³ confirmed Witkin's finding that there was a wide range of individual differences in performance on the Gottschaldt test (a forerunner of the Embedded Figures Test). They also found

individual differences in a retention task involving retroactive inhibition. Both tests are described as ones that tap the ability to extract material "which is obscured by experimental manipulation of stimulus conditions."³⁴

The results of ten years of studies using rod-and-frame, tilting-room-tilting-chair, and rotating-room tests in determining field dependence were published by Witkin et al. in 1954.³⁵ In studies of adults, children and psychiatric patients they found that subjects scoring high in field dependence tended to behave more passively (as measured by standard personality tests and interviews) than field independent subjects. Field dependent subjects also tended to have lower self-esteem, worse opinions of their bodies, poor impulse control and fear of sexual and aggressive impulses. The desire for mastery in various areas tended to predominate in the field independent subjects. The authors provided clear evidence for the usefulness of laboratory methods in the study of individual differences.

Linton³⁶ found that on each of three measures of conformity there was a correlation between field dependence and conformity, even though the three measures did not correlate highly with each other. She suggested that field dependence tests may tap a central tendency which is displayed to greater and lesser degrees on individual conformity tasks.

Witkin³⁷ developed the Embedded Figures Test, based on the drawings of German psychologist K. Gottschaldt. This paper and pencil test correlated highly with the space orientation tests, such as rod-and-frame, but required no special equipment. The difficulty with the

test was that some subjects were requiring as much as one and one-half hours to complete it. In response to this problem, a short form of the Embedded Figures was developed which correlated over .95 with the original test, but took only 36 minutes to administer.³⁸

Criticisms of Early Field Dependence Research

At least six researchers scrutinized the work of Witkin and various colleagues working with him from 1948 to 1954.^{39, 40, 41, 42, 43, 44}

One criticism of Personality Through Perception by Witkin et al.⁴⁵ is offered by Postman⁴⁶ who suggested that the conclusions offered in the book are unwarranted by the evidence shown. Instead of bringing clinicians and researchers closer together, as Witkin et al. asserted, Postman claims that the opposite would occur, because of the dubious nature of the projective personality tests employed in several of the studies, and from which rather broad conclusions had been drawn.

In one imaginative verification of the data provided by Witkin et al.,⁴⁷ a sample of dancers was compared with a sample of college students to determine if extensive "body experiences" would facilitate performance of spatial orientation and perceptual tasks by dancers.⁴⁸ The dancers did not perform better than the students. The author contended, though, that differences in performance were not even in the direction Witkin would predict. Since the differences were not described within the text of the paper, the conclusions cannot be critically evaluated.

A replication of the basic hypotheses proposed by Witkin et al.⁴⁹ showed support for them, but the results were not quite as strong.⁵⁰

The author shared Gruen's⁵¹ concern regarding the possibility that field dependence involves several factors, not just one as Witkin implies. Young⁵² suggested the use of factor analysis in the solution of the problem.

In a critique of Witkin's work, Gruen⁵³ made the following criticisms: (a) Witkin oversimplifies the relationship between personality and perception, (b) as a result he makes propositions regarding personality-perception relationships which do not stand, (c) Witkin ignores various mediators which effect the performance of space-orientation tasks, (d) identical scores on Witkin's perception tests may reflect entirely different styles of performance, (e) subjects may not perceive stimulus situations the same way experimenters do, and (f) individuals are not perceptually consistent.

In a study experimentally manipulating the degree of uncertainty subjects felt before performing perceptual tasks, it was found that uncertainty increased field dependence.⁵⁴ The author accounted for differences between the findings of Witkin et al.⁵⁵ and her findings on range of judgments and mean deviation scores by pointing out that often Witkin's subjects had done several perceptual tests prior to doing the rod-and-frame. This series of tests could have resulted in increased uncertainty for subjects, leading to increased field dependence, resulting in internal invalidity due to testing effects.

Scores on the tilting-room test and the Embedded Figures Test have not shown a significant difference between field dependent and field independent subjects in their susceptibility to a persuasive message.⁵⁶

(The scores on the two tests were in the predicted directions, but not statistically significant.) When the experimenters combined the two test scores for each subject into a "Perceptual Index," the difference between those who changed their attitudes and those who did not reached significance at the .001 level. People who changed their positions in the opposite direction to the advocated one (a boomerang effect) were neither high nor low on field dependence.

In another criticism of Witkin et al.,⁵⁷ Dana and Goocher⁵⁸ suggested that: (a) the Embedded Figures Test is not a statistically reliable measure of perception, (b) the Thematic Apperception Test sections used in Witkin's work are difficult to reliably score, and (c) the Embedded Figures Test is not a valid measure of field dependence. In a direct response, Witkin⁵⁹ answered their criticisms point by point. At one point Witkin cited in support of his methods the same personal communication which they used to question them.

One study found that on objective measures of such concepts as self-concept, psychological mindedness, and independence of judgment, field dependent subjects and field independent subjects scored similar to one another. However, on self-report measures, as had been used in several Witkin studies, there was a relationship between field dependence and these traits.⁶⁰ The author suggested that field dependence might correlate highly with a high need for social desirability.

Conclusions

First, field dependence is a personality variable that has generated a great deal of research in recent years and which has roots in

two areas of concern for early psychologists: how people orient themselves to "up" and "down" and how Gestalt psychology might inform notions of the perceptual field. Second, field dependence seemed to have developed as the result of four factors coming together, (a) researchers reporting large individual differences in subjects' performance on spatial orientation tasks, (b) the development of easy-to-administer, brief and accurate instruments for measuring field dependence, (c) a new recognition by researchers that individual differences could be investigated experimentally, and (d) the comparing of field dependence data with information from personality inventories.

Third, several studies challenged the pioneering work by Witkin and his colleagues, pointing out alleged problems and pointing the way to areas for further research. Subsequent research regarding the issues raised by critics has shown Witkin and his colleagues to have been essentially correct in nearly all early formulations of the theory of field dependence. In fact, recent reviews such as those mentioned earlier in this article have cited many studies dealing with the same issues raised in early criticisms, with the weight of evidence usually in Witkin's favor.⁶¹ (A brief historical article such as this one does not allow for detailed treatment of this issue.)

Field dependence, with roots in Perceptual and Gestalt psychology, is one of those rare individual difference variables that is based upon actual differences in the way people experience stimuli. The result has been a strong and usable variable that has withstood criticisms and the test of many years. Finally, it is clear that Herman Witkin made a

tremendous contribution to the area of field dependence research and through that, to all individual difference research.

NOTES

1. Donald R. Goodenough, "The Role of Individual Differences in Field Dependence as A Factor in Learning and Memory," Psychological Bulletin 83 (1976):675-694.
2. Deborah P. Waber, "Biological Substrates of Field Dependence: Implications of the Sex Difference," Psychological Bulletin 84 (1977): 1076-1087.
3. Herman A. Witkin and Donald R. Goodenough, "Field Dependence and Interpersonal Behavior," Psychological Bulletin 84 (1977):661-689.
4. Herman A. Witkin et al., Psychological Differentiation (New York: Wiley, 1962).
5. Joseph Jastrow, "On the Judgment of Angles and Positions of Lines," American Journal of Psychology 5 (1892):220-223.
6. Kurt Koffka, "Perception: An Introduction to the Gestalt-Theorie," Psychological Bulletin 19 (1922):531-585.
7. Elizabeth Neal, "Visual Localization of the Vertical," American Journal of Psychology 37 (1926):287-291.
8. Kurt Lewin, Principles of Topological Psychology (New York: McGraw-Hill, 1936).
9. Kurt Lewin, A Dynamic Theory of Personality (New York: McGraw-Hill, 1935), p. 73.
10. Eugenia Hanfman, "A Study of Personal Patterns in An Intellectual Performance," Character and Personality 9 (1940):315-325.
11. Neal, "Visual Localization."

12. Clyde E. Noble, "The Perception of the Vertical: III. The Visual Vertical As A Function of Centrifugal and Gravitational Forces," Journal of Experimental Psychology 39 (1949):839-850.

13. Solomon E. Asch and Herman A. Witkin, "Studies in Space Orientation: I. Perception of the Upright with Displaced Visual Fields," Journal of Experimental Psychology 38 (1948):325-246.

14. Solomon E. Asch and Herman A. Witkin, "Studies in Space Orientation. II. Perception of the Upright with Displaced Visual Fields and with Body Tilted," Journal of Experimental Psychology 38 (1948):455-477.

15. Herman A. Witkin and Solomon E. Asch, "Studies in Space Orientation. III. Perception of the Upright in the Absence of A Visual Field," Journal of Experimental Psychology 38 (1948):603-614.

16. Herman A. Witkin and Solomon E. Asch, "Studies in Space Orientation. IV. Further Experiments on Perception of the Upright with Displaced Visual Fields," Journal of Experimental Psychology 38 (1948): 762-782.

17. Herman A. Witkin, "The Nature and Importance of Individual Differences in Perception," Journal of Personality 18 (1949):145-170.

18. Herman A. Witkin, "Perception of Body Positions and of the Position of the Visual Field," Psychological Monographs 63 (1949): 7 Whole No. 302.

19. Herman A. Witkin et al., Personality Through Perception (Westport, Conn.: Greenwood Press, 1972) (originally published 1954).

20. Herman A. Witkin, "Perception of the Upright When the Direction of the Force Acting on the Body is Changed," Journal of Experimental Psychology 40 (1950):93-106.

21. Herman A. Witkin, "Individual Differences in the Ease of Perception of Embedded Figures," Journal of Personality 19 (1950): 1-15.

22. Witkin, "Perception of the Upright."

23. Ibid.

24. Herman A. Witkin, "Further Studies of Perception of the Upright When the Direction of the Force Acting on the Body is Changed," Journal of Experimental Psychology 43 (1952):9-20.

25. Cecil W. Mann, "Visual Factors in the Perception of Verticality," Journal of Experimental Psychology 44 (1952):460-464.

26. Witkin and Asch, "Studies in Space Orientation. IV."

27. Cecil W. Mann and Randolph O. Boring, "The Role of Instruction in Experimental Space Perception," Journal of Experimental Psychology 45 (1953):44-48.

28. Ibid.

29. Witkin and Asch, "Studies in Space Orientation. IV."

30. Mann, "Visual Factors."

31. Herman A. Witkin, "Comment on 'Role of Instruction in Experimental Space Orientation,'" Journal of Experimental Psychology 46 (1953): 135-136.

32. Mann and Boring, "Instruction in Space Perception."

33. Eugene S. Gollin and Alan Baron, "Response Consistency in

Perception and Retention," Journal of Experimental Psychology 47 (1954): 259-262.

34. Ibid., p. 259.

35. Witkin et al., Personality Through Perception.

36. Harriet B. Linton, "Dependence on External Influence: Correlates in Perception, Attitudes, and Judgment," Journal of Abnormal and Social Psychology 51 (1955):502-507.

37. Witkin, "Perception of Embedded Figures."

38. Douglas N. Jackson, "A Short Form of Witkin's Embedded-Figures Test," Journal of Abnormal and Social Psychology 53 (1956): 254-255.

39. Richard H. Dana and Buell Goocher, "Embedded Figures and Personality," Perceptual and Motor Skills 9 (1959):99-102.

40. Rogers Elliot, "Interrelationships Among Measures of Field Dependence, Ability, and Personality Traits," Journal of Abnormal and Social Psychology 63 (1961):27-36.

41. Frances Gross, "The Role of Set in the Perception of the Upright," Journal of Personality 27 (1959):95-103.

42. Arno Gruen, "The Relation of Dancing Experience and Personality to Perception," Psychological Monographs 69 (1955): 1, Whole No. 379.

43. Leo Postman, "[A Review of] Personality Through Perception," Psychological Bulletin 52 (1955):79-83.

44. Harl H. Young, "A Test of Witkin's Field-Dependence Hypothesis," Journal of Abnormal and Social Psychology 59 (1959):188-192.

45. Witkin et al., Personality Through Perception.

46. Postman, "Personality Through Perception."
47. Witkin et al., Personality Through Perception.
48. Gruen, "Dancing Experience."
49. Witkin et al., Personality Through Perception.
50. Young, "A Test of Field-Dependence."
51. Gruen, "Dancing Experience."
52. Young, "A Test of Field Dependence."
53. Arno Gruen, "A Critique and Re-Evaluation of Witkin's Perception and Perception-Personality Work," Journal of General Psychology 56 (1957):73-93.
54. Gross, "Role of Set."
55. Witkin et al., Personality Through Perception.
56. Harriet Linton and Elaine Graham, "Personality Correlates of Persuasibility," in Personality and Persuasibility, Eds. Carl I. Hovland and Irving L. Janis (New Haven, Conn.: Yale University Press, 1959), pp. 69-101.
57. Witkin et al., Personality Through Perception.
58. Dana and Goocher, "Embedded Figures."
59. Herman A. Witkin, "'Embedded Figures and Personality': A Reply," Perceptual and Motor Skills 11 (1960):15-20.
60. Elliot, "Interrelationships Among Measures."
61. Donald R. Goodenough, Personal Communication, March 25, 1980.